



Is Your House a Sick House? The Mold/Air Conditioner Duct Connection ¹

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Sick House. The name has an ominous sound, but it doesn't mean that the house is leaning or falling apart. A sick house is a house with a serious air quality problem. The area can be described as "sick," mainly because people develop symptoms of illness such as headaches, watery eyes, nausea, skin disorders and fatigue when they must spend considerable time where there is a build-up of air pollutants from household products, building materials, formaldehyde and/or respirable particles. In Florida, sick houses are usually houses with a serious moisture problem. Moisture also plays an important role in promoting the growth and spread of mold (mildew). Molds produce spores, tiny encased "seeds," which float in the air. Under severe contamination thousands of mold spores can be suspended in each cubic foot of air. When people are exposed to mold spores over and over they can develop allergic symptoms.

Problem Source -- Air Conditioning Ducts

Visible mildew/mold, is easy to identify because of its discoloration and odor. There are products on the market, usually containing chlorine bleach, which can kill molds. Keeping humidity in a home low can

help keep visible mildew from returning. But when mold spores get into the air conditioning system, they can settle in the air conditioning ductwork along with dust and other contaminants. Air conditioning duct systems, especially in Florida's humid climate, can be virtual incubators for microbial pollutants such as mold and bacteria. With the alternating high and low humidity conditions which regularly occur in air conditioning ducts during air conditioner operation, molds will grow, spread, produce spores and distribute the spores throughout a house. Mold contamination in air conditioning ducts poses a serious problem.

Inhibiting Mold Growth in Air Conditioning Ducts

To effectively prevent conditions that lead to air condition ductwork contamination, two considerations must be made:

1. Keep the ducts free from dirt and spores.
2. Check and repair any leaks in ducts that might introduce dirt and moisture.

1. This document is Fact Sheet FCS 3240, a series of the Department of Family, Youth and Community Sciences, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida. Publication date: October 2001. First published: October 1992. Reviewed: October 2001. Please visit the EDIS web site at <http://edis.ifas.ufl.edu>

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Duct Contamination Control

Consider dealing with both moisture and soils that might enter the ductwork because both are involved with the problem of air duct contamination and the resulting indoor air quality problem.

Soil Build-up in Air Conditioner Ducts

- Effective filtering is essential for keeping air handling ducts clean. New filter types now available can remove more and smaller particles. In homes with pets and/or activities that produce particles, traditional fiberglass filters may not provide the protection needed.
- Dirt build-up can be controlled by regularly inspecting and changing air conditioning filters. The build-up of dust on air conditioning filters causes air to by-pass the filter and carry organic dirt and spores into the ducts.
- Air conditioner ductwork must be kept in good repair. Leaks around duct joints in attics can introduce dust and spores.

Duct Moisture

- The presence of moisture in air conditioning ducts is common since the air leaving the air conditioner evaporator is saturated. In Florida, air conditioning is used most of the year providing little time for ducts to dry out.
- High moisture in ducts can cake dirt and provide an environment for mold to grow. This situation leads to serious indoor air contamination problems.

Cleaning Air Conditioning Ductwork

Through neglect, or sometimes normal use over long periods of time, air handling ducts in homes accumulate dirt and molds and bacteria begin to grow. Often the situation is identified when family members begin to experience allergic symptoms. The house has become "sick." Can the ducts in a "sick-house" be restored to a safe level?

The question of how to restore contaminated air supply systems is becoming an urgent one. This

demand is being addressed by firms who market air duct cleaning services. Because barriers to entering the air duct cleaning business are minimal and uniform standards of professional practice have yet to be adopted, anyone with an interest can enter the field. This has permitted firms to spring up with controversial techniques. This is not to say that most duct cleaning businesses are unethical. Companies are seeking the best solutions for each individual home with contamination problems. They are looking for new and better ways to serve a very troubled clientele. The clientele is also wary because little is known about duct cleaning.

What is the best source of information for consumers about air duct cleaning? Unfortunately, since there are few or no published papers by independent researchers, most of the information available is from people associated with the air duct cleaning industry.

Since air duct cleaning procedures have evolved mostly from trial and error as unique and creative solutions have been sought, there has been considerable confusion in the minds of consumers who fear or who are experiencing indoor air quality problems. Here are some insights gleaned from a publication, *Indoor Air Review I*. The articles have all been written by people involved with firms specializing in air duct cleaning, filtration, and consulting.

- **Vacuum-truck equipment** was first used to suck the dirt out of the system, but proved to be ineffective because it is virtually impossible to vacuum debris from one single point in a complex duct system.
- Next, **hand-held blowers** to assist in dislodging loose dirt from the extreme ends of the ductwork, but served to remove dirt only from the extreme ends of the ductwork.

- **Air compressors** were introduced as a more effective alternative to portable blowers. The use of skippers or snakes, which moved through systems with compressed air to assist in air washing air ducts.
- **Compressed air-washing and vacuuming** are now sometimes augmented by **manual scrubbing with brushes and flexible rods and whips** and can assist in cleaning hard to reach dirt buildups in air handling systems. Where ducts are lined with fiberglass insulation, this treatment could damage the insulation and release fiberglass fibers to further contaminate air.
- The use of HEPA **filtration** can be used to trap very small particles. This might be important for commercial duct cleaning where equipment exhaust stays inside a building, but offers little for residential duct cleaning where filtration equipment is placed outside.
- For truly contaminated duct systems professionals can **cut into the duct work** to insert the vacuum line to remove localized dirt build-up. Some commercial air duct cleaners are equipped with tiny fiber-optic cameras to assist in locating dirt build-up and to confirm cleaning effectiveness.

The devices mentioned so far do not address the deeper concerns about mildew, molds, bacteria that can be a problem in Florida's climate.

- Several national firms began marketing controversial **air duct cleaning/encapsulating techniques** in the late 1980's as an alternative to vacuum systems. The idea has been to trap and hold trapped dirt and spores. The use of sometimes questionable materials and the poor effectiveness of the procedure brought several Florida counties to require HVAC (heating, ventilation, air conditioning) licenses for contractors performing air duct cleaning services.
- The use of **sanitizing solutions** to kill mold and bacteriological growth opens the question of safety for humans and pets in the air conditioned area.

A serious concern in Florida is that the dirt that gets into air conditioning ducts often becomes caked and will be difficult to remove by cleaning methods currently available. When an air conditioner is operating, the air in the ducts is cool and saturated with moisture. Dirt particles exposed to this humid air take up moisture and can stick together and to surfaces in the ducts. Fiberglass lining in ducts make cleaning virtually impossible.

The following comments were made at the Symposium, 1990 Indoor Air Quality in Homes: Synthesizing the Issues and Educating Consumers." In answering the question Can you minimize problems from furnace ducts by cleaning them?, Dr. Thad Godish² replied:

"A lot of fiberglass ducts are used, and in high humidity environments, they are going to trap organic dust which can result in mold and bacteria growing on them. In response to that, a number of companies are selling service which really is not going to do much good simply because the ducts get recontaminated so quickly. It is not possible for the cleaning to be as effective as it needs to be. One of the problems with fiberglass ducts is that they have a very rough surface which makes an excellent trap for dust. A lot of dust is organic dust, and if you have organic dust you are going to get the growth of mold and bacteria."

Dr. Harriet Burge³ answered the question, Can fiberglass-lined ductwork be cleaned?, as follows:

"Fiberglass lined ductwork that is merely dirty (i.e., that has accumulated dust and dirt) can be cleaned if care is taken not to damage the fiberglass. However, if such ductwork has become wet (that is, if mold is actually growing on the fiberglass), it cannot be cleaned. The mold penetrates into the fiberglass and will begin to grow again as soon as surface growth is removed. The use of biocides (agents designed to kill molds and bacteria) is not recommended in ductwork because of the danger to the building occupants of exposure to the biocide."

What considerations should people make before engaging air conditioning duct cleaning services?

What do you know about the company? What questions should you ask? Consider these:

- How long has the company been in business?
- Written testimonials can be impressive, but it can be more important to talk with company clients of a year ago or longer. Most treatments cannot be guaranteed for long periods of time. Test results of mold or other microorganisms before and soon after cleaning do not tell you if molds return in a few months.
- What chemicals are used in the treatment process?

Endnotes

¹Excerpts from the August, 1991 issue of the *Indoor Air Review*.

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